DOCUMENT RESUME

ED 103 715 CE 003 341

TITLE	Structural Foundations; Carpentry: 901891.
INSTITUTION	Dade County Public Schools, Miami, Fla.
PUB DATE	9 Oct 74
NOTE	19p.; An Authorized Course of Instruction for the Quinmester Program. For related documents, see CE 003 212-4, CE 003 333-7
EDRS PRICE	MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS	*Building Plans; *Building Trades; *Carpenters; Construction (Process); Construction Industry; Course Content; Course Objectives; *Curriculum Guides; Masonry; Secondary Education; Structural Building Systems; *Trade and Industrial Education
IDENTIFIERS	*Quinmester Program

ABSTRACT

The curriculum guide outlines a course designed to help the student become proficient in the skills of planning, layout, and building foundations. The course to be presented in grades 11 and 12 contains six blocks of study (introduction to foundations, forming concrete, piling, marine foundations, applied mathematics, and a quinmester post-test) which are subdivided into units and total 135 hours in length. Instruction is accomplished by means of classroom lessons, textbook references, and laboratory exercises. Emphasis is placed on manipulative processes. Also presented are the course goals, specific block objectives, course outline, and a nine-item bibliography. A quinmester post-test is appended. (Author/BP)

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

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Course Outline

CARPENTRY - 9163
(Structural Foundations)

Department 48 - Ouin 901891

CE003391

DADE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION • 1974

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D A D E C O U N T Y P U B L I C S C H O O L S

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M I A M I, F L O R I D A 33132

Course Outline

CARPENTRY - 9163
(Structural Foundations)

Department 48 - Quin 901891

county office of

VOCATIONAL AND ADULT EDUCATION

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Dr. E. L. Whigham, Superintendent of Schools
Dade County Public Schools
Miami, Florida 33132

October 9, 1974

Published by the School Board of Dade County

Course Description

9163	48	901891	Structural Foundations
State Category Number	County Dept. Number	County Course Number	County Course Title

Overview: A study of concrete foundations as applied to various size buildings.

Objectives: The student will construct a basic form in accordance with a plan.

Content: A study of various types of foundations, piles and slabs for supporting building structures.

Selection Considerations: The student in this course will be expected to have the skills and knowledge of building construction plans and a basic knowledge of mathematics.

PREFACE

This third quinmester course outline is entitled "Structural Foundations." It is designed to help the student become proficient in the skills of planning, layout and building foundations. He will develop positive attitudes regarding the value and dignity of work.

This course consists of nine quins to be presented in grades 11 and 12.

Students in this course should show an interest in the carpentry trade. This course contains seven blocks of study, which are subdivided into several units each and is 135 hours in length. The student in this course will be expected to have the skills and knowledge of building construction plans and a basic knowledge of mathematics.

Instruction is accomplished by means of classroom lessons, textbook references and laboratory exercises. Emphasis is placed on manipulative processes.

The bibliography lists materials offering additional information in the field of building construction.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

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with Suggested Hourly Breakdown

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GOALS

The student must be able to:

1. Demonstrate the ability to develop the attitudes, skills, knowledge and values required for entry into the carpentry trade.

2. Develop exploratory skills and knowledge in specific areas within this occupational field in order to advance in the carpentry trade.

3. Become acquainted with the various career opportunities available in this broad occupational field.

4. Develop good safety habits and discipline as they apply to the carpentry trade.

5. Develop positive attitudes and pride in good craftmanship in the carpentry trade.

6. Increase the manipulative skills and knowledge as they apply to foundations.

7. Satisfactorily complete a post-test before advancing to the next quinmester course.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - INTRODUCTION TO FOUNDATIONS

The student will be able to:

1. Define the purpose of foundations in the field of construction.
2. Describe at least two kinds of reinforcement used in concrete.

BLOCK II - FORMING CONCRETE

The student will be able to:

1. Draw and label a section of a foundation, including steel reinforcement and measurements.
2. List three methods of trying or clamping a form to strengthen it for a concrete pour.
3. Explain the difference between bracing and back-filling.

BLOCK III - PILING

The student will be able to:

1. Explain why piles are not used for all building construction purposes.
2. Sketch a four story building showing the wall columns and the piles properly placed beneath the building.
3. List three materials used in the construction of piles.

BLOCK IV - MARINE FOUNDATIONS

The student will be able to:

1. Describe the method of pouring or placing concrete into an underwater form.
2. Discuss the proper methods of constructing forms to be used underwater.
3. Name two materials used for underwater forms.

BLOCK V - APPLIED MATHEMATICS

The student will be able to:

1. Determine the amount of concrete needed to fill a form measuring 18 inches deep, 6 feet wide and 10 feet long.
2. Calculate in square feet the amount of form wood needed to build a form measuring 2-1/2 feet deep, 5 feet wide and 8 feet long.
3. Determine the amount of concrete neede for a slab foundation and a grade beam indicate by the instructor.

BLOCK VI - QUINMESTER POST-TEST

Course Outline

CARPENTRY - 9163
(Structural Foundations)

Department 48 - Quin 901891

I. INTRODUCTION TO FOUNDATIONS

A. Definition and Purpose
1. One story building foundations
2. Multi-story building foundations
3. Bridge and tower foundations
4. Marine foundations
a. Bridges
b. Seawalls

B. Kinds of Foundations
1. Wall
2. Grade beams
3. Slabs
4. Piles
5. Pile caps

C. Structure and Design
1. Building codes
2. Keys and keyways
3. Quality of concrete
4. Steel reinforcement
5. Types of footings

II. FORMING CONCRETE

A. Design and Construction
1. Batterboard layout
2. Form aligning
3. Measuring
4. Plumbing and leveling
5. Strengthening
a. Bracing
b. Tying

B. Quality of Forms
1. Earth support
2. Weight of walls
a. Formwood thickness
b. Metal forms
c. Form design

C. Quality of Footings
1. Quality of concrete mixture
2. Form width and depth

3. Size and amount of reinforcement steel
    a. Properly placed steel
    b. Steel tying
4. Carrying weight
    a. Column
    b. Concrete wall
    c. Block wall
    d. Metal wall
    e. Wood frame wall

III. PILING

A. Shoring
    1. Concrete
        a. Quality and design
        b. Length and angle
    2. Steel
        a. Quality and design
        b. Length and angle
    3. Pipe
        a. Quality and design
        b. Length and angle

B. Sheet
    1. Steel
        a. Design
        b. Length
    2. Wood
        a. Design
        b. Length

C. Earth Consistency
    1. Rock
    2. Coral
    3. Sand
    4. Muck
    5. Combination
        a. High or low ground
        b. Near water

D. Concrete Pile Caps
    1. Quality of concrete
    2. Geometric shapes
        a. Location of piles
        b. Weight of structure
    3. Steel reinforcement
        a. Size of steel
        b. Amount of steel
    4. Quality of forms

E. Wooden Pile Caps
    1. Quality and size of wood

2. Design and construction
   a. Bridge
   b. Pier

F. Steel Pile Caps
   1. Size and amount of steel
   2. Design and construction

IV. MARINE FOUNDATIONS

A. Sea Wall Footing
   1. Underwater forms
      a. Design and re-construction
      b. Placing and anchoring
      c. Bracing, tying and clamping
   2. Weight of wall
      a. Size of forms
      b. Design and construction
      c. Quality of concrete mixture

B. Bridge and Pier Footing
   1. Underwater forms
      a. Design and construction
      b. Placing and anchoring
      c. Bracing and clamping
   2. Weight of bridge or pier
      a. Size of forms
      b. Steel reinforcement
      c. Quality of concrete mixture

V. APPLIED MATHEMATICS

A. Area and Volume in English and Metric
   1. Pile caps or pads
   2. Slabs
   3. Building lot
   4. Footers
      a. Excavation
      b. Form Lumber

B. Construction Costs
   1. Hourly
      a. Tradesmen
      b. Laborers
      c. Office staff
   2. Contractural
      a. Contractor
      b. Engineers
      c. Architect
      d. Specialists
      e. Jobbers

3. Materials
   a. Concrete
   b. Lumber
   c. Hardware
   d. Tools
4. Rentals
   a. Machinery
   b. Power hand tools

VI. QUINMESTER POST-TEST

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A P P E N D I X

Quinmester Post-Test Sample

QUINMESTER POST-TEST

Name_____Date_____Score_____

Multiple Choice

1. Foundation forms are usually built of: (____)
   a. boards
   b. plywood
   c. metal
   d. back-fill

2. The ingredients of concrete are: (____)
   a. cement and sand
   b. stone, gravel and cement
   c. sand, cement and lime
   d. stone, sand and cement

3. Concrete piles are normally placed in: (____)
   a. rock
   b. sand
   c. concrete
   d. flint

4. Reinforcement for a concrete floor slab is: (____)
   a. 6" o.c. wire mesh
   b. number 6 steel rods
   c. 6" x 6" wire mesh
   d. rods 6" apart

5. To add strength to a form we use: (____)
   a. "C" clamps
   b. reinforcement rods
   c. jiffie clamp
   d. plywood

6. A strong foundation contains: (____)
   a. reinforcement steel
   b. steel wire
   c. rods and steel
   d. steel and mesh

7. A pile cap covering three piles contain: (____)
   a. wire mesh
   b. plywood
   c. jiffie clamps
   d. reinforcement steel

8. A pile cap covering only one pile contains (____)
   a. wire mesh
   b. plywood
   c. jiffie clamps
   d. reinforcement steel

9. A fastener used for building forms is the: (____)
   a. msonry nail
   b. finish nail
   c. common nail
   d. form screw

10. Excavated earth should be calculated in: (____)
   a. cubic inches
   b. lenial inches
   c. cubic feet
   d. square yards

11. Concrete needed should be calculated in: (____)
   a. square yards
   b. cubic yards
   c. cubic feet
   d. lenial yards

12. Form plywood is calculated in: (____)
   a. lenial feet
   b. square feet
   c. cubic feet
   d. cubic yards

13. How much concrete is needed to fill a form measuring 1' x 1-1/2' x 36': (____)
   a. 38-1/2 cubic feet
   b. 54 cubic feet
   c. 55 cubic feet
   d. 37-1/2 cubic feet

14. How many cubic feet are contained in a form measuring 1-1/2' x 2' x 100': (____)
   a. 203-1/2
   b. 300
   c. 103-1/2
   d. 250

15. How many cubic yards of concrete would be ordered to fill a form measuring 1' x 1-1/2' x 71': (____)
   a. 4
   b. 6
   c. 5
   d. 7

16. The main material needed for building forms is: (____)
   a. planks
   b. plywood
   c. boards
   d. whalers

17. "Length times width" method is used in calculating: (____)
    a. form concrete
    b. 2" x 4" lumber
    c. sand and cement
    d. form plywood

18. "Tight-line" is used for: (____)
    a. locating batter boards
    b. leveling form sides
    c. measurements
    d. aligning forms

19. Depth and width determines: (____)
    a. strength of footings
    b. volume of concrete
    c. concrete needed
    d. size of excavation

20. L x W x H ÷ 27 determines needed: (____)
    a. lumber
    b. concrete
    c. sand, cement and stone
    d. size of footer trench

ANSWER KEY TO POST-TEST

1. b
2. d
3. b
4. c
5. c
6. a
7. d
8. d
9. c
10. c
11. b
12. b
13. b
14. b
15. a
16. b
17. d
18. d
19. a
20. b